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A Retrospective Study on Maternal and Fetal Outcomes in Gestational Diabetes Mellitus Complicating Pregnancy

Dr. P. Kanaka Mahalakshmi[1], Dr. G. Prameela Devi[2*]

[1]3rd Year Post Graduate in OBG, Sri Venkateswara Medical College, Tirupati - 517 501, India

[*2]Corresponding-Author, M.D Associate Professor, Department of Obstertrics and Gynecology, Government Maternity Hospital, Tirupati, India

Abstract: ***Background:*** ***Gestational Diabetes Mellitus (GDM) is defined as carbohydrate intolerance of variable degree with onset or first recognition during pregnancy. Indian women have high prevalence of diabetes and increased risk of GDM and associated complications.*** ***Aim:*** ***The present study was undertaken to determine the maternal and foetal outcomes in GDM complicating pregnancy.*** ***Methods:*** ***Retrospective analysis of the data of GDM complicating pregnancies from the records of Government Maternity Hospital, Tirupati, from June 2019 to November 2019.*** ***Results:*** ***During the study period, 68 GDM women were identified. Pregnancy induced hypertension was associated with 38.5% of GDM women. Most patients 76.4% were controlled on diet alone. EMLSCS was done in 81% cases and the most common indication for was fetal distress (57.65%) and big baby (34.7%).*** ***Conclusion:*** ***Appropriate treatment of GDM with diet, oral hypoglycemic agents, or insulin to achieve euglycemia and early detection can achieve near-normal maternal and neonatal outcome.***

Keywords: Gestational diabetes mellitus, pregnancy outcome, NICU and SNCU admissions

1. Introduction

Gestational diabetes mellitus is defined as carbohydrate intolerance of variable degree with onset or first recognized during pregnancy. Indian women are considered to be high risk population for developing gestational diabetes mellitus and have 11 fold increased risk compared to Caucasians [1]. Seshiah *et al* [6] in a study found the prevalence of GDM to be very high being 17.8% in urban, 13.8% in semi-urban, and 9.9% in rural area of Tamil Nadu. In general, gestational diabetes mellitus is said to complicate 1-16% of all pregnancies [2].

In spite of high prevalence of gestational diabetes mellitus, there is no consensus regarding optimal screening method [1]. Fifth international workshop conference on gestational diabetes, American Diabetes Association, American college of Obstetricians and Gynecologists (ACOG) recommend selective screening based on risk assessment. Indian population comes under high-risk category and selective screening may miss more than 30% of gestational diabetes mellitus cases [3]. Most convincing evidence of adverse pregnancy outcome in gestational diabetes was provided by hyperglycemia and adverse pregnancy outcome (HAPO). In India, Seshiah *et al*. performed a community-based study on the prevalence of GDM in South India and came up with Indian guidelines for GDM which are commonly used in Indian condition [5].

Gestational diabetes mellitus contributes to several maternal and fetal complications. Maternal complications include preeclampsia, polyhydramnios, metabolic derangements, increased rate of instrumental or cesarean delivery. Long term maternal complication is increased rate of development of NIDDM. Fetal complications include macrosomia, shoulder dystocia, birth trauma, metabolic derangements and sudden intrauterine demise. The risk of fetal anomaly is not increased in gestational diabetes unlike pregestational diabetes mellitus.

Early recognition, specific treatment of gestational diabetes mellitus in the form of diet or insulin or both decreases the incidence of maternal and fetal complications. The present study is undertaken to study maternal and foetal outcomes, so that, current status of management of GDM complicating pregnancy can be assessed, so as to make further recommendations.

2. Aim and Objectives

To determine the feto-maternal parameters that are likely to be affected by GDM:
1) Maternal and fetal outcome
2) Mode of delivery
3) Perinatal morbidity and mortality

3. Materials and Methods

Study Area: Government Maternity Hospital, Tirupati, a tertiary care Hospital.

Study Subjects: All women with GDM complicating pregnancy attending Government Maternity Hospital, Tirupati, who were diagnosed by various criteria either outside or at our hospital.
Study Period: Retrospective analysis of the data of GDM complicating pregnancies from the records of Government Maternity Hospital, Tirupati, from June 2019 to November 2019.

Inclusion Criteria: All cases of GDM diagnosed either in our hospital or referred from elsewhere.

Exclusion Criteria: Patients with overt diabetes mellitus.

Method of Data Collection

Women with GDM complicating pregnancy who were delivered at GMH, Tirupati, during the study period were included in the study. Retrospective data from the records which included details of BMI of mother, gestational age at the time of delivery, visited antenatal checkups, treatment modality, mode of delivery, indications for which cesarean section if performed, type of surgery, demographic variables along with the neonatal data were included. Neonatal information included gender, birth weight, 5minute APGAR scores, gestational age, need for resuscitation, requiring immediate admission to NICU/SNCU, duration of stay in the hospital, and cause of death of the neonate if present, were recorded.

Parameters studied were:

1) BMI of mother
2) treatment modality
3) Mode of delivery
4) Birthweight of baby
5) APGAR scores
6) Admissions to SNCU and NICU

Statistical Analysis

The data was entered in MS excel 2007 Microsoft corporation publication and analyzed using Epi Info CDC Version 7.2.0.1. Statistical significance for continuous variables was tested using student t-test and discrete variables using CHI SQUARE test. Frequencies were described using percentages.

4. Results

During the study period, total of 6045 deliveries occurred out of which, 68 Gestational Diabetes Mellitus women were identified. The percentage of DM complicating pregnancy in our hospital was 1.12%. The following table illustrates the demographic variables of the women with GDM complicating pregnancy.

Table 1: Demographic Variables

	GDM (n=68)
Age (years± SD)	25.86 ± 3.32
Mean weight (kg± SD)	62.4 ± 0.75
BMI (kg/m^2 ± SD	25.7 ± 4
Socioeconomic status	
Lower	16(23%)
Middle	45(67%)
Upper	7(10%)

From the above table, there is a significant association of GDM with middle socioeconomic status. Mean BMI was 25.7 ± 4 which is considered as overweight was significantly associated with GDM.

Table 2: Treatment Modality in GDM

Mode of Treatment	n=68
Diet	52 (76.4%)
Oral hypoglycemic drugs	9 (13.2%)
Insulin therapy	7 (10.2%)

It is inferred from the above table that most of them were controlled on diet alone. Insulin therapy was started to 10.2% of the patients when they presented to the hospital with uncontrolled sugar levels at term.

Table 3: Maternal Obstetric Outcome in GDM

Obstetric Outcome	n=68
Pregnancy induced hypertension	26 (38.5%)
Preterm delivery	4 (5.8%)
Vaginal delivery	13 (19%)
Instrumental delivery	5 (7.3%)
Cesarean delivery	55 (81%)

EMLSCS was done in 81% of cases. The most common indication was fetal distress (47.65%) followed by big baby. Shoulder dystocia occurred in 4 cases. Third degree perineal tear was identified in two cases of instrumental delivery.

Table 4: Perinatal Outcome In GDM

Perinatal Outcome	n=68
Mean birth weight (kg± SD)	2989±537
5minute APGAR <7	9 (13.2%)
NICU/SNCU admissions	27 (39.7%)
Hypoglycemia	17 (25.6%)
Hyperbilirubinemia	2(2.9%)
Respiratory distress	10 (14.7%)
Neonatal death	2 (2.9%)

The above table illustrates the perinatal outcomes in GDM. 5minute APGAR scores <7 were frequently associated with increased NICU and SNCU admissions. Hypoglycemia was the most common cause of NICU and SNCU admissions and was seen in 25.6% of babies of GDM.

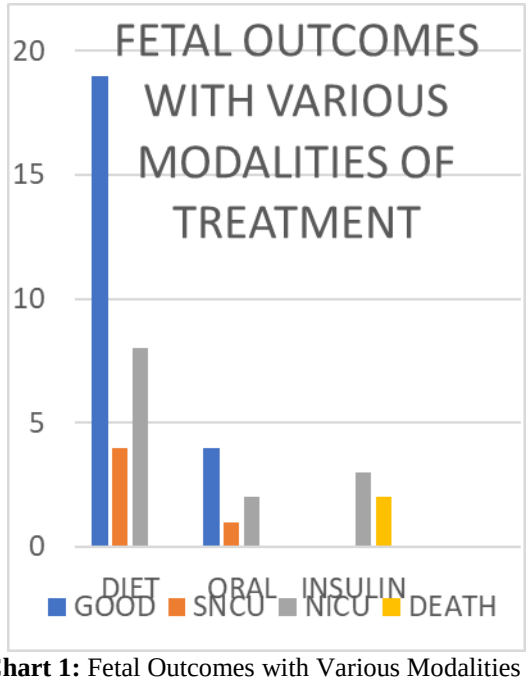

Chart 1: Fetal Outcomes with Various Modalities of Treatment

5. Discussion

The present study showed the peak maternal age group between 25-29 years. This finding is in accordance with the study done by Hedderson et al [7](2003) which had

maximum incidence between 25-34 years. Landon Mark B et al[8] (2009) study had similar finding of 29 years. A study done by Seshiah[6] et al found that the prevalence of GDM increases with age from 14.5% in 15-19 years to 25% in >30 years of age. In the present study, GDM was found to be higher in middle and upper socioeconomic class, but Rajput et al observed higher prevalence in low socioeconomic class.

The present study had 76.4% of the cases on diet therapy only while the rest were on OHA (13.2) and insulin therapy (10.2%). Jacobson John D et al[9] (1989) had only 13 out of 97 cases on insulin. Adams Kristina M et al[10] (1997) had 76 cases on insulin and 297 cases only on diet therapy. This upholds the fact that less than 50% GDM cases require insulin therapy. Babies born to GDM mothers on insulin therapy had increased number of NICU/SNCU admissions when compared with mothers on diet or OHA.

There is a high incidence of operative delivery rate in women in GDM. 81% cases underwent LSCS and 19% cases delivered vaginally. Majority of caesarean deliveries performed in GDM cases were due to foetal distress (47.65%) followed by big baby, hypertension complicating pregnancy, previous LSCS and doppler changes which is consistent with the study done by Deerochanawong et al[10] in which, of 709 women, 70% of those diagnosed as GDM by WHO criteria and NDDG criteria underwent LSCS which is also supported by above studies. Instrumental delivery occurred in 7.3% of cases in view of big baby with failed maternal forces. Shoulder dystocia occurred in 4 cases, out of which one baby developed erb's palsy. Third degree perineal tear was identified in two cases of instrumental delivery.

In present study, 38.5% had features of pregnancy induced hypertension. The high body mass index or obesity of women with gestational diabetes predisposed them to hypertension. In study by Deerochanawong et al[10], it was observed that 50% of GDM diagnosed by NDDG criteria and 12% of GDM diagnosed by WHO criteria had preeclampsia. Schmidt et al commented that 5% of GDM case diagnosed by WHO or ADA criteria had preeclampsia. They observed that GDM was associated with a 2-3-fold greater risk of preeclampsia.

In this study, mean birth weight was significantly higher in babies of GDM (2989+/_537 kg) when compared with the normal birth weight percentile for Indian babies. Macrosomia was seen in 26.7% of cases. Shoulder dystocia occurred in 4 cases, of which one baby had erb's palsy. Odar E et al[12] observed that the babies of mothers with GDM (WHO criteria) were more likely to be macrosomic (36.7%), perinatal mortality (16.7%) and have shoulder dystocia (23.3%) than those of normal mothers.

Hypoglycaemia was found in 25.6% of babies of diabetic mother and was the most common cause of NICU/SNCU admissions. Two neonatal deaths occurred during the study period due to neonatal hypoglycaemia with uncontrolled maternal blood sugar levels. 5minute APGAR scores <7 constituted about 13.2% and was frequently associated with NICU/SNCU admissions. Hyperbilirubinemia was found in 2.9% of cases. Respiratory distress was seen in 14.7% of cases. Crowther et al[13] in his study of Treatment of mild gestational diabetes vs no treatment, he found hypoglycaemia, hyperbilirubinemia, respiratory distress, and NICU admission were found respectively as 7% and 4%, 9% and 9%, 5% and 4%, and 71% and 61% in both intervention and control group.

6. Conclusion

The feto-maternal outcomes in this study indicates poor management during preconceptional, antenatal and intrapartum period and inadequate awareness and counselling regarding screening protocols. Implementation of universal screening protocols helps in early diagnosis, better management and good outcome in DM complicating pregnancy, henceforth should be promoted in all health care institutes.

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